CLAIMS

1. A switching power-supply unit including an inductor or a transformer and a plurality of switching elements switching a current flowing in the inductor or the transformer and converting power by turning on and off the switching elements, the switching power-supply unit comprising a switching control circuit that turns on the next switching element in accordance with a change of a voltage or a current generated due to turning off of a switching element in an ON-state, that sequentially turns on and off the switching elements in association with each other, that repeats a series of on-off operations of the switching elements periodically, that determines an ON-period of each of the switching elements in accordance with a condition independently provided for each of the switching elements, and that controls the ON-period of each of the switching elements.

2. The switching power-supply unit according to Claim 1, wherein a dead time in which two consecutive switching elements from among the plurality of switching elements are turned off is provided between ON-periods of the two switching elements, and wherein the dead time is arranged in accordance with a delay time from turning off of the switching element in the ON-state and turning on of the next switching element.

3. The switching power-supply unit according to Claim 2, wherein the dead time is set such that the switching element is turned on when a voltage across the switching element becomes zero or reduces to near zero.

4. The switching power-supply unit according to any one of Claims 1 to 3, wherein the switching control circuit turns on the next switching element using a voltage at the inductor or the transformer generated due to turning off of the switching element in the ON-state from among the plurality of switching elements.

5. The switching power-supply unit according to any one of Claims 1 to 4, wherein the switching control circuit detects an output voltage to a load to determine the ON-period in accordance with the output voltage.

6. The switching power-supply unit according to any one of Claims 1 to 4, wherein the switching control circuit detects a change or a polarity of a voltage generated at the inductor or the transformer to determine the ON-period.

7. The switching power-supply unit according to any one of Claims 1 to 4, wherein the switching control circuit detects the current flowing in the inductor or the transformer to determine the ON-period.

8. The switching power-supply unit according to any one of Claims 1 to 4, wherein the switching control circuit detects a voltage across the switching element to determine

the ON-period.

9. The switching power-supply unit according to any one of Claims 1 to 4, wherein the switching control circuit detects a current flowing in the switching element to determine the ON-period.

10. The switching power-supply unit according to Claim 9, wherein the switching control circuit determines the ON-period of the switching element such that the switching element is turned off when the current flowing in the switching element becomes zero or reaches near zero.